



[Billing Code 4140-01-P]

DEPARTMENT OF HEALTH AND HUMAN SERVICES

National Institutes of Health

Government-Owned Inventions; Availability for Licensing

AGENCY: National Institutes of Health, HHS.

ACTION: Notice.

SUMMARY: The inventions listed below are owned by an agency of the U.S.

Government and are available for licensing in the U.S. in accordance with 35 U.S.C. 209 and 37 CFR Part 404 to achieve expeditious commercialization of federally-funded research and development. Foreign patent applications are filed on selected inventions to extend market coverage for companies and may also be available for licensing.

FOR FURTHER INFORMATION CONTACT: Licensing information and copies of the U.S. patent applications listed below may be obtained by writing to the indicated licensing contact at the National Heart, Lung and Blood Institute, Office of Technology Transfer and Development, National Institutes of Health, 31 Center Drive Room 4A29, MSC2479, Bethesda, MD 20892-2479; telephone: 301-402-5579. A signed Confidential Disclosure Agreement may be required to receive copies of the patent applications.

SUPPLEMENTARY INFORMATION: Technology descriptions follow.

Enhanced Functionalization of Carbon Nanoparticles for Biomedical Applications

Description of Technology:

The invention pertains to methods of increasing the density of carboxylic acids on the surface of a carbon nanoparticle that can be functionalized with biologically relevant molecules, such as antibodies or peptides, for biomedical applications. Advantageously, the method could increase functionalization of a nanoparticle by at least about 1×10^7 functional groups/g of nanoparticle. The method includes contacting an oxygen-containing functional group on a surface of a carbon nanoparticle with a reducing agent to provide a hydroxyl group; reacting the hydroxyl group with a diazoacetate ester in the presence of a transition metal catalyst to provide an ester and then cleaving the ester to provide a carboxylic acid group. The carboxylic acid can further be secondarily functionalized to an acyl chloride, an amide, pegylated, a biotinylate, a folate, a thiol, a maleimide, an active ester, an amine, a chelated gadolinium, an azide, an alkyne, a protein tag, or a dendrimer. Examples of notable nanoparticles that can be derivatized using this method include carbon nanoparticles such as carbon nanotubes, fullerenes, graphenes, graphene oxides, and nanodiamonds; with or without fluorescent properties. Fluorescent nanoparticles are of particular interest for functionalization as they are applicable to both research and diagnostic applications and can be visualized through microscopy.

Potential Commercial Applications:

- Imaging

- Therapeutics

Competitive Advantages:

- Higher degree of functionalization for carbon nanoparticles

Development Stage:

- Early Stage

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Intellectual Property: HHS Reference No. E-207-2016/0

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